ELECTRICAL REVIEW

Vol. CXLVII 8th SEPTEMBER 1950 No. 3798

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AN EXPLANATION

Our readers will appreciate the very difficult conditions under which this issue makes its appearance. Editorial pages, being naturally the last to go to press, to ensure topicality, were caught in the printing dispute which has caused a stoppage of all typesetting in London printing works. Those pages which are printed normally had already been done and we express our regrets that the editorial pages have had to appear in this form and have been reduced in number. It has also been impossible to include the classified advertisements section.

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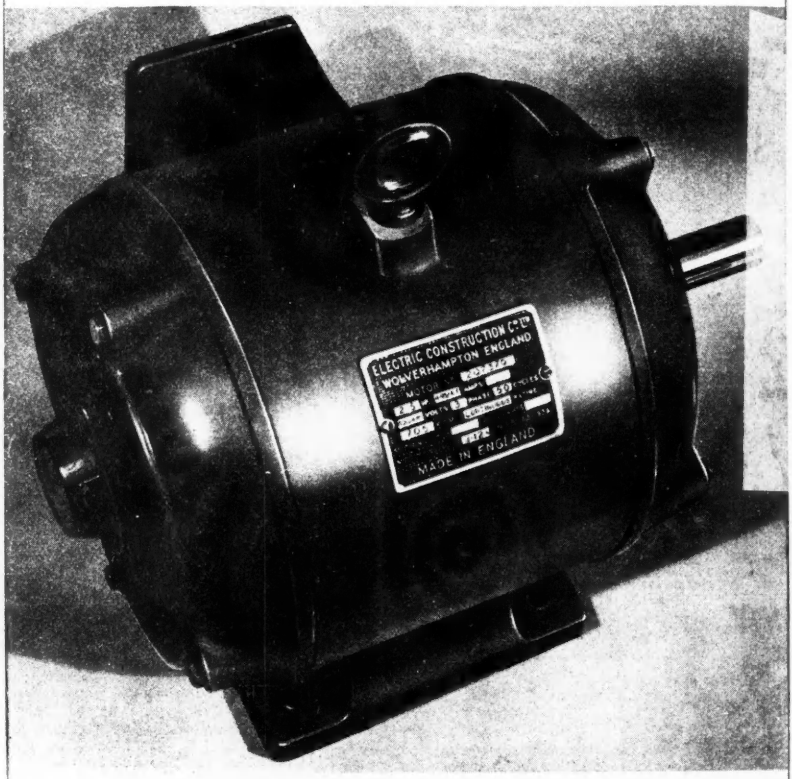

MOTORS FROM STOCK

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ELECTRICAL REVIEW

Vol. CXLVII No. 3798 8th September, 1950

THE OLDEST ELECTRICAL PAPER ESTABLISHED 1872

ENERGY RESOURCES

Conservation by Efficient Use

This year the British Association for the Advancement of Science enjoyed the hospitality of the city of Birmingham in this, by happy coincidence, jubilee year of the university in that centre of industrial engineering progress.

What better setting could there have been for the presidential address? In London, as chairman of the fourth World Power Conference, Sir Harold Hartley spoke of "energy in the service of Man" and urged that over-optimistic speculation about newer possible sources of energy should not diminish either the endeavour to make the utmost of those more immediately available or retard their further development.

At Birmingham Sir Harold fittingly varied the theme to "Man's Use of Energy", observing that only within the last hundred years has man learned fully to understand the import of the word "energy", its significance in every physical and chemical change, the means by which life itself is sustained.

There is no need, in this centenary year of the formulation of the second law of thermo-dynamics, which governs the conversion of thermal energy to work of use to man, to enlarge upon the profit that has come from that landmark in the history of engineering science. But it is well to remember that the environment man has created for himself has made a steadily increasing demand for energy, and in the last fifty years the world's consumption of electricity has increased a hundred-fold.

There has been an accompanying six-fold increase in the efficiency of generation. One would like to believe that users are employing the tool thus given them with equal care, lest demand should outstrip the means of supply. This year's B.A. presidential address may be regarded as a natural sequel to last year's, though the world's demand for food may be a simpler problem than that of the provision of power. As Sir Harold said ... "there is a limit to the capacity of the human stomach, but none to man's appetite for energy" ... which is the multiplier of human energy and new uses are being found for it every day.

The latter half of the nineteenth century was a period of continuous expansion and steadily rising world production. The first half of this century brought a fresh insight to the nature and relationship of matter and energy which has quickened the pace in every direction. How long can the world's resources continue to satisfy the growing demands being made upon them?

The general pattern, which is already familiar to engineers, was dis-

closed at the World Power Conference. The papers provided an informative factual background and invited discussion of several individual aspects some of which might fruitfully be pursued. Mr. R.Y. Sanders' summary showed the world picture as a whole to be one of rapid exploitation that is developing faster than ever before; it seems almost to conform to an exponential law of expansion.

The world's main source of power is still the coal-oil-water trinity, useful contributions today being roughly: solid fuel 56 per cent, liquid and gaseous 37 per cent and water power 7 per cent. Only the last mentioned is perennial and even that has its "question marks", while the rate of extraction of the other two is giving rise to growing anxiety. Whether the efficiency of power application is commensurate with the efficiency of its generation has become a vital question.

X-ray microscopy

An early conviction of Roentgen's was that his then newly-discovered X-rays were incapable of being concentrated by lenses in the usual optical way. His successors have shared his pessimism, for most substances absorb this kind of radiation readily. It has seemed unlikely that any material could be made highly refractive and, at the same time, transparent to X-rays. An ordinary spectacle lens has an X-ray focal length of the order of 100 km; but conventionally-made glass mirrors, with a thin coating of heavy metal applied by vacuum evaporation to enlarge the critical angle of reflection from the curved surface, have been experimentally used in an American university laboratory as an approach to X-ray microscopy. Some image formation has been possible in this way and, although this method may not be unusual in resolving power, it has other features that may appeal to biologists and metallurgists for special examinations in cases in which neither the optical nor electron microscope is entirely satisfactory.

Colliery Refuse.

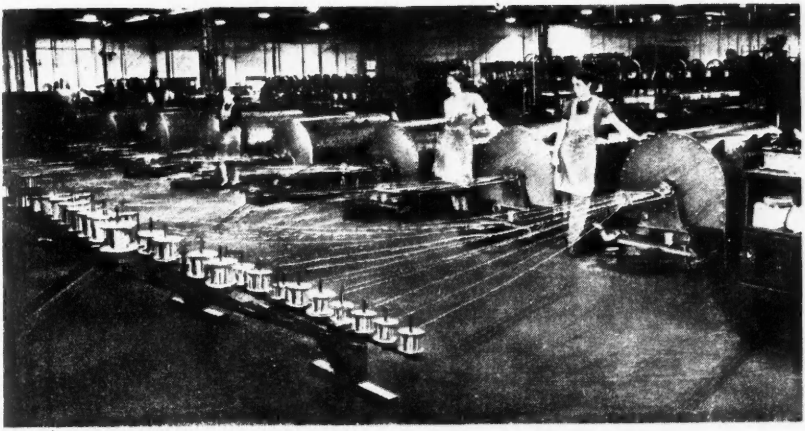
A sidelight on investigations concerning the use of colliery refuse for generating electricity is given by Dr. R. Lessing in a letter to The Times. His estimate is that the reject from the thorough cleaning of 200 million tons of raw coal (about the annual output from British mines) has a heat value equivalent to that of 8 to 10 million tons of good boiler fuel. This is up to one-third of the tonnage of coal now burned in B.E.A. power stations. If it proves economically possible to design combustion chambers to deal satisfactorily with material containing perhaps 60 per cent of ash, it would be not only a major contribution towards coal saving but also a national boon in abating the nuisance (or curse) of colliery spoil banks.

Prospects in Pakistan.

With the partition of India in 1947 Pakistan, though left with the most important part of the major crops - jute and cotton, was virtually without factories for processing these raw materials. Government schemes for rectifying the position and at the same time raising the standard of living are being seriously hampered by the lack of power. An industrial mission from the United Kingdom reports that the field is a most promising one both for the direct stimulation of trade between the United Kingdom and Pakistan and for the employment of British resources to assist Pakistan in the planning and execution of development schemes. There appears to be a good opportunity here for British manufacturers and contractors not only to assist in meeting an immediate power shortage estimated at 100,000 kW but to co-operate in the much more comprehensive long-term hydro-electric plans.

Industrial Finishes

On the finish of a product may depend not only its appearance but its efficiency and durability, and the importance that is attached in industry to securing finishes of the highest quality can be judged by the fact that it is estimated that every year about £240 million is spent on paint and paint application alone. That finishing materials and techniques available in Britain today compare favourably with those of other countries was evident from the displays of nearly fifty manufacturers at the Industrial Finishes Exhibition held at Earls Court, London. Some particulars of the exhibits are given in this issue.



CABLE MANUFACTURE

Production of Small Types

When we visited the Newcastle-under-Lyme works of Rist's Wires & Cables, Ltd., a few weeks ago we saw one of the largest plants in this country for producing plastic covered cables. The company was started in 1902 when Mr. D. A. V. Rist, the present managing director, was an apprentice in a small firm making ignition coils and accumulators. In 1916 he took over the concern, which between 1919 and 1928 became the largest British producer of ignition coils, making over 11,000 a week.

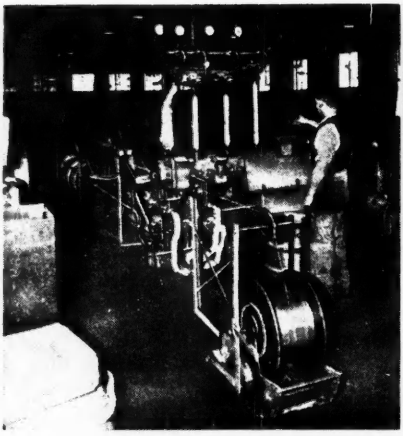
In 1930 the production of a first-grade automobile cable was investigated both here and in America. "Seamed" cables made of layers of rubber pressed together over a conductor wire were not only considered obsolete in America but were not allowed by underwriters to be used in buildings, etc. It was, therefore, decided to adopt American methods, some of the necessary machinery being manufactured here and the rest imported.

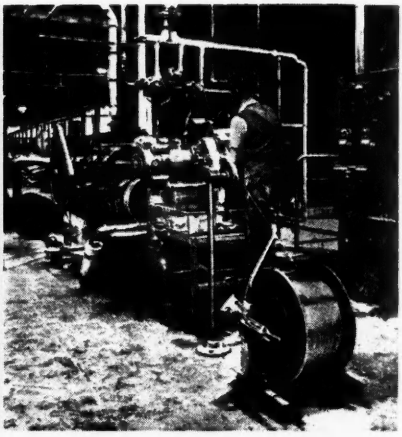
During the war the company was compulsorily moved to Nuneaton, more plant was installed and the production of aircraft and automobile cables rose rapidly. At about this time the production of extruded plastic cables was in the pioneer stage and the company imported one of the first plastic extruders into this country. For a period of nearly eighteen months during the war they made no less than 1,750 miles of plastic cable a week, apart from the normal production of aircraft and automobile cables.

The company's standing as a manufacturer of small cables was recognized during the war when it was invited to become a member of the Cable Makers' Technical Committee. To-day it makes the complete wiring equipment for almost every British car. This entails specialized plant for the manufacture of pressed parts such as tags, eyelets, etc., also automatic plating equipment and a battery of automatics for the turned parts.

Raw materials such as copper, cotton, rubber and metals are delivered to the factory and placed

Above: Each of the bunching machines shown in the heading illustration can produce up to 100,000ft of cable in one continuous length





Left: High-speed plastic extrusion machine. Right: This continuous vulcanizing extruder is especially valuable long lengths of cable

in sub-stores immediately adjacent to the machines which are using them. There is also a large bulk store room which forms a reserve stock. This scheme reduces double handling and also gives departmental supervisors warning if materials are not being delivered on schedule.

Heavy gauge wire is re-drawn to 30 s.w.g., 36 s.w.g. and 42 s.w.g., or intermediate sizes according to requirements. Both British and American machines are used for wire drawing and all diamond dies are re-polished and maintained in a special department adjacent to the wire drawing shop.

After leaving the drawing machines the wire is tested before going to the tinning department. The drums of drawn wire are placed on the tinning machine and to avoid stretching the wire is taken off by a flier. After being tinned the wire is reeled on bobbins ready for twisting or bunching. As the factories efficiency depends on making cable in long lengths, machines are used which can bunch up to 100,000ft in one continuous length.

From the bunching department, the drums of wire, which now form the conductor, are passed to the extrusion department to be covered with rubber or plastic. The Company is justifiably proud of its extrusion plant and, in particular, of its plastic extruders, which have been designed and constructed in the works. These machines are capable of extruding cables at speeds far in excess of those possible with other types, and an even more advanced machine is in course of construction.

For rubber covering, after the rubber compound has been mixed it is taken from the warming mills straight to the rubber extruder, this machine having been developed by the company's own engineers. For long runs a continuous vulcanizing extruder is used, wherein immediately the wire has been rubber covered the cable passes through a tube about 175ft long containing steam at a high pressure which completes the vulcanizing process. Here again, the company has altered the equipment on the lines of its own type of extruding machine and has been able to speed up production considerably. Only two machines remain which make cable by the old longitudinal method.

All covered cable is then spark tested before being braided and finished. A battery of rotary braiding machines works day and night to keep up the flow of drums either to the dispatch department or the lacquering department. Cables are lacquered for automobile and aircraft use, and the equipment for this purpose ensures that every layer of lacquer is evenly applied and properly baked, the result being a highly polished

cable which is impervious to oil or water.

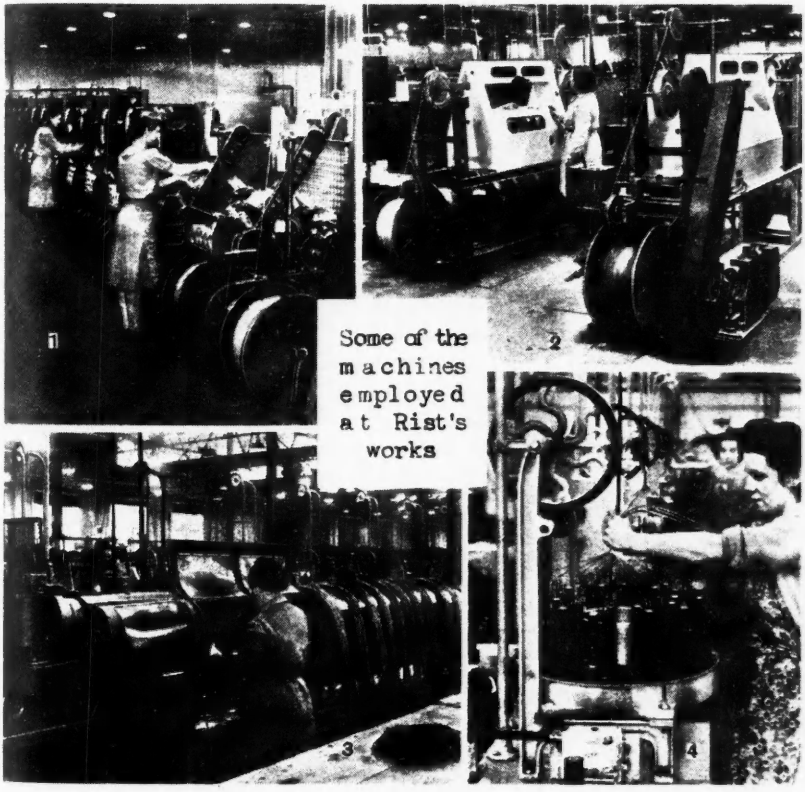
Another activity is the manufacture of looms for automobiles, passenger vehicles, aircraft and tanks. This is a specialized business and the different sizes and variation of colours for circuit identification run into several hundreds.

The cable is first cut to length and the ends stripped of insulation on an automatic cutting machine after which they are formed to shape on special jigs to ensure that they will fit exactly to the vehicle or aircraft. The cables are then taken to the loom braiding machine and braided over with cotton to hold them in position. The ends of the leads are fitted with the required tags or terminals, and finally the completed looms are tested.

A large department is devoted to telephone and switchboard cords for the G.P.O., from the manufacture of the tinsel conductor with its various types of insulation and textile cover to the finished cord ready for use.

Many concerns, instead of buying cable for wiring up electrical devices now order the complete assembly or finished lead, thus avoiding waste. In the manufacture of these commodities the company uses up short lengths of wire and cable, thus achieving an all-round economy.

(1) A battery of braiding machines. (2) This machine cuts automobile loom cable to length and strips the ends of insulation. (3) Automobile looms are finally braided overall with cotton to hold the cables in position. (4) Covered cable is spark tested before braiding.



Some of the machines employed at Rist's works

VIEWS ON THE NEWS

By Reflector

Commenting upon the money spent on Government "information services" in a letter to the Manchester Guardian the managing director of an industrial concern also has a rather unkind word for the B.E.A. He asks:- "What was the cost of the stands and displays of the British Electricity Authority at a whole series of agricultural shows from the Royal downwards ? Presumably these were to stimulate consumption of electricity - while our production manager is overhauling our stand-by plant in readiness for winter cuts." I think he has chosen a bad example for his purpose. It is agreed that agriculture is as vital to the country as industry and its efficiency is a primary consideration. The idea of the electricity authorities is not merely to stimulate consumption but to educate farmers in the proper and efficient use of electricity. There may be scope for criticism of some of the B.E.A.'s. publicity methods, but not here.

* * *

There has been a great deal of correspondence in The Times recently on the subject of lamp standards; it was originated by Mr. John Betjeman who criticized the general design in what a subsequent correspondent considered to be "intemperate language". The chairman of the Royal Fine Art Commission (Lord Crawford and Balcarres) joined in to say that the matter was causing the Commission much concern and it had approved few of the designs submitted. Lord Crawford and Balcarres pointed out that even standards well-designed for trunk roads might look grotesque in different surroundings. It seems to me that the makers of standards are in a quandary. How can they produce a standard for each particular position ? Yet this is what they must do if they are to fit in with the differing characteristics of any route. They are forced to compromise and introduce a few designs which will more or less fit in with any surroundings. The users, or their contractors, must play their part by choosing the best available types for specified positions and be doubly careful about siting, for appearance as well as for effective illumination.

* * *

Very few people realize the variety of services performed by the General Post Office. Quite apart from its original purpose it has now become the principal issuer of all kinds of licences, from guns to radio, and a dispenser of pensions and allowances. It is also extensively engaged in the clothing business. Not only does it supply uniform and other garments to most Government Departments, its activities in this line also extend to the national boards, including the British Electricity Authority. I wonder if the defects in some of its services would not be fewer if the G.P.O's. attention was concentrated upon its proper functions.

* * *

Women often profess to "see through" one another. A "woman" who is easily seen through has appeared in this country from Germany for Exhibition at the Food Fair, now running at Olympia. She is a transparent anatomical model in which the internal organs are illuminated by thirty lamps and, it is said, there are over six miles of wire to represent nerves and veins and about 300 feet of lighting wire. She utters electrically recorded speech which is easily controlled.

* * *

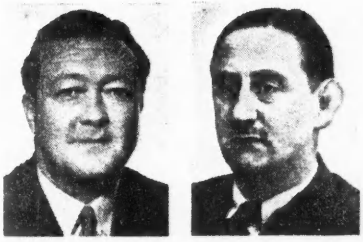
The Kent Messenger reports that a haunted windmill at Meopham may feature in a film if the owner agrees. It is said that the ghost - that of a former resident who hanged himself - has not been seen for years and the report also says that the mill has been electrically operated since 1929. Apparently electricity can number exorcism among its many virtues.

PERSONAL AND SOCIAL

News of Men and Women of the Industry

The Association of Supervising Electrical Engineers announces that the examining board for the W.E. Highfield Shield Competition, 1949-50, has awarded the shield and prize of £5 5s. to Mr. J. McCartney, of Leigh-on-Sea, for his paper on "An Introduction to Atomic Physics." The presentation will take place at the Association's meeting at the Lighting Service Bureau, London, W.C.2, on 17th October next.

Mr. W.C. Huston has been appointed marketing manager, lamp and lighting sales, to the British Thomson-Houston Co., Ltd. He joined the Mazda lamp department in 1931 and later became



Mr. W.C. Huston Mr. C.W.M. Phillips

personal assistant to the director of lamp sales. In 1940 he was made Manager of the B.T.H. lighting department. He is a director of Claude General Neon Lights, Ltd. and of the British Colour Council. He is also chairman of E.D.L.A.C., an active member of the E.L.F.A. Council, and a member of the I.E.S.

Mr. C.W.M. Phillips, A.M.I.E.E., F.I.E.S., has been appointed manager of the B.T.H. lighting department. He joined the company in 1927 and, after completing his engineering apprenticeship, was for a time on turbine test work. In 1934 he joined the lamp department, Crown House, London, his work being particularly concerned with the early stages of mercury vapour street lighting. During the war he worked on the development of fluorescent lighting for factories and was appointed assistant manager of the B.T.H. lighting department in 1946. Mr. Phillips has taken an active part in the Illuminating Engineering Society. He was chairman of the Technical Committee of E.D.L.A.C. until January of this year.

Mr. L.L. Goodman, B.Sc.(Eng.), A.M.I.E.E., A.M.I.Mech.E., has joined the staff of the British Electrical Development Association, as technical officer dealing with industrial power matters. Mr. Landon Goodman was educated at Repton School, Manchester College of Technology,

Mr. L.L. Goodman Mr. W. Robinson

Royal Technical College, Salford, and London University where he took the B.Sc. (Eng.) degree with first class honours in mechanical and electrical engineering. After an engineering

apprenticeship he joined the staff of A.W. Taylor & Co., Manchester, in 1938. In the same year he was commissioned in the Royal Engineers (T.A. and was mobilised at the outbreak of war. Invalided out in 1940 with the rank of acting captain, Mr. Goodman returned to Taylors where he was engaged in planning and designing mechanical handling and hydraulic equipment. In 1943 he transferred to K. T.S. (Engineers), Ltd., Manchester, as area manager. In 1948 he went to Ferranti, Ltd., where he was engaged in sales development work and in charge of the development of new industrial uses of radio-frequency heating.

Mr. W. Robinson, B.Sc.(Tech.), A. M.I.E.E., F.I.E.S., has joined the technical staff of E.D.A. as lighting specialist. Mr. Robinson served a three-year apprenticeship with Metropolitan-Vickers after which he had three years at Manchester University. After graduating, Mr.Robinson entered the employment of R.C. Cutting & Co., lightning conductor and electrical installation specialists, London, as contracts manager and in 1937 he joined the staff of the E.L.M.A. Lighting Service Bureau. During the war he served in the Royal Engineers and spent over three years in India and Burma. He held the rank of major when he was demobilised and returned to the Lighting Service Bureau where, at the time of joining E.D.A's staff, he held the position of chief engineer. At E.D.A. Mr. Robinson will deal with all matters concerning domestic, and public lighting. Mr. Robinson is a member of the Stoke Newington Borough Council and chairman of the Finance Committee.

Mr. D.B. Eastell, Graduate I.E.E., until recently assistant electrical engineer to the British Engine, Boiler and Electrical Insurance Co., Glasgow, has been elected to the board of Easco Electrical, Ltd., as director of the marine and electrical equipment division, home and export.

Mr. H. de C. Falle, O.B.E., A.M.I. E.E., who has been general sales manager of Aberdare Cables, Ltd., since its inception, has been elected to the board. Mr. Falle has been a director for some years of South Wales Switchgear, Ltd. After leaving the Navy in 1919 with the rank of lieut-commander, R.N.V.R., Mr. Falle joined the G.E.C., subsequently being sales manager of Ruths Steam Storage, Ltd., and Laurence, Scott & Electromotors, Ltd. In the middle '30s, he joined International Combustion, Ltd., from which company he took up his present position.

Mr. R.H. Cooke, of Philips Electrical, Ltd., has been appointed assistant manager of the x-ray department. Mr. Cooke joined Philips in 1933 and was transferred to the Birmingham branch in 1935. In 1946 he returned to London as article chief of the industrial x-ray section. For the past four years Mr. Cooke has maintained close contact with universities engaged in nuclear physics research and has been responsible for the installation of many high-voltage cascade generators. In addition he has conducted much of the Philips company's liaison with the Atomic Energy Research Establishment.

Mr. H.J. Knight, Associate I.E.E., has been appointed to the sales staff of Measurement, Ltd. Mr. Knight was previously with the Midlands Electricity Board, and before that with the S.W. & S. Electric Power Co. He has also held various positions on the metering and distribution side of the industry.

Group Capt.E. Fennessy, O.B.E., A.M.I.E.E., has been appointed managing director of the newly formed Decca Radar, Ltd. After training as an electrical engineer at Queen Mary College, University of London, he joined the research staff of Standard Telephones & Cables, Ltd. In 1938 he became one of the team of radar research workers who, under the direction of Sir Robert Watson-Watt, were developing Britain's radar defences. During the war he served in the R.A.F.V.R. with H.Q. No.60 Group, which was responsible for the construction, maintenance and operation of the R.A.F. radar

stations. In 1942 he was made responsible for the planning, construction and operation of the new radar navigation and blind bombing systems. For this work he was awarded the O.B.E. After the war Group Capt. Fennessy joined the board of the Decca Navigator Co., Ltd.

Mr. W.J. Johnson has been appointed resident sales representative in the Newcastle area of J.A. Crabtree & Co., Ltd. For the last three years Mr. Johnson has been engaged as a sales engineer at head office where he has been responsible for technical correspondence and works liaison in the control gear department.

Mr. C.L.G. Fairfield, M.A., A.M.I.E.E., A.M.I. Mech.E., has been appointed a director of Mullard Equipment, Ltd.

Mr. D. Gibson, late manager of Chemical Products, has been appointed Publicity Manager to Venner Time Switches, Ltd., and Venner Accumulators, Ltd. Mr. Gibson was formerly press officer to the Ministry of Agriculture, and was later with the Ministry of Information. Before returning to Fleet Street, he acted as P.R.O. to the United Nations War Crimes Commission.

Mr. W.D. Akester has been elected to the board of Ransomes, Sims & Jefferies, Ltd.

In the account of the I.E.E. Golf Competition in the Electrical Review of 25th August the name of the winner of the singles competition was given as Mr. W.G. Maddock. This should have been Mr. W.G. Murdoch (who also won the P.G. Cup).

The London and Home Counties Area Final of the Electrical Industries Benevolent Association Golf Championship was played at the R.A.C. Country Club, Woodcote Park, Epsom, on 17th August, thirty-seven players competing. Prizes were presented by Mr. P.V. Hunter (deputy chairman of British Insulated Callender's Cables Ltd.) to the winner, Mr. A.G. Richards (S.E. Electricity Board, Croydon) the runner-up, Mr. A.F. Trinder, O.B.E. (Gurney's Radio & Electrical Engineers, Southall) and the scratch prize winner, Mr. T.T. Reedy (Contractor, Watford).

The annual works outing of the Wandleside Cable Works, Ltd., was held on 19th August, at Margate. Luncheon was taken at Faversham, when Mr. W.L. Wray, director and general manager, reviewed the progress of the Company

OBITUARY

Mr. A.P. Davies. The death occured on 19th August, at the age of fifty-nine of Mr. A.P. Davies after a long illness. He was export manager of Lancashire Dynamo & Crypto Ltd. Mr. Davies joined the Lancashire Dynamo & Motor Co., in 1909 as an apprentice at the Trafford Park Works. Subsequently he was transferred to the London office and became manager of the Export Department in 1920. He represented his company at meetings of the Dynamo & Motor Agreement Export Section and served on the B.E.A.M.A. Export Band for several years. Representative members of the directors and staff of L.D.C. Ltd., attended the funeral service at Croydon on 22nd August.

Mr. F.E. Denne. The death occured on 23rd August, at the age of fifty-three, of Mr. F.E. Denne, who was for thirty-eight years mains engineer at Hove.

Mr. F.W. Jarvis. The death occured on 31st August at the age of fifty-two of Mr. Frederick William Jarvis, communications manager of Associated Newspapers. Mr. Jarvis was an authority on telegraphic communications and was the inventor of the Muirhead-Jarvis picture telegraphy machine.

WILLS

Mr. H. Hooper, secretary, Midlands Division, B.E.A. who died on 20th Dec. last, intestate, left estate "so far as at present can be ascertained" valued at £7,256. gross, (£6,652 net)

Mr. R. Daw, A.M.I.E.E., who was with the London Electricity Board, and died on 14th June last, left £8,676 gross, (£8,059 net).

AIRCRAFT ELECTRICAL EQUIPMENT

Display at Farnborough

The annual flying display and exhibition of aeronautical equipment and instruments organized by the Society of British Aircraft Constructors (S.B.A.C.) was held at the Royal Aircraft Establishment at Farnborough, Hants, from 5th to 10th September. As has been the case with previous exhibitions in the series, this year's display included much of electrical interest.

Catering equipment shown by the General Electric Co., Ltd., included a 24V 500W 1-pt hot cup, which heats up its contents in three or four minutes, a heated container for storing 12 plates of food or 1½ gal of liquid, and a 24V 250W light-weight coffee percolator. Other exhibits included aircraft and airport lighting equipment and a display of Pirelli-General aircraft cables.

Another interesting range of cables for use in aircraft was displayed by British Insulated Callender's Cables Ltd.

The British Thomson-Houston Co., Ltd., exhibited a variety of equipment including magnetos and distributors, a.c. and d.c. motor-generators, actuators, switches, circuit breakers and motor-generator sets with electronic voltage regulators. Other items included an electronic ignition tester for multi cylinder engines and standard "Mazda" lamps for aircraft.

A prominent feature on the stand of E.K. Cole, Ltd., was the cloud and collision warning equipment, a 3 cm radar system designed for the detection of cumulo-nimbus cloud and, hence, areas of severe turbulence associated with such clouds.

The exhibits of the Plessey Co., include a wide range of linear and rotary actuators, cartridge starters turbine starters, hydraulic pumps, and a selection of "Breeze" wiring accessories.

A radar navigational aid shown for the first time by Ferranti Ltd. was a distance measuring equipment which provides the pilot of an aircraft with continuous visual information on distances and homing to a selected ground beacon.

The Westinghouse Brake & Signal Co., Ltd., showed a selection of light-weight rectifiers for providing d.c. power to aircraft and some small assemblies of which are used for operating conductor coils or can be up-rated in current for intermittent operation of actuators.

The principal exhibit of Marconi's Wireless Telegraph Co., Ltd., was a working installation of a v.h.f. direction finder which is designed to facilitate the planned control of aircraft in the proximity of an airfield and allows a continuous bearing check to be kept. A 50W v.h.f. transmitter and a v.h.f. airborne transmitter/receiver with 140 communication channels were also shown.

Other v.h.f. equipment was shown by Standard Telephones & Cables Ltd. together with the remote display console of a precision approach radar equipment, this being the first time that a British-made ground-controlled approach talkdown system had been on view to the public.

Testing Appliances

Apart from exhibiting and demonstrating its aircraft the English Electric Co., Ltd., displayed electrical testing equipment for reciprocating and turbine engines and for engineering auxiliaries, together with rotary and linear actuators and a number of a.c. and d.c. motors, alternators and generators.

The stand of Sangamo Weston Ltd. bore a wide range of instruments for navigational systems, electrical power induction and temperature and movement measurements, together with relays, thermometer bulbs and examples of various ground test sets.

Comprehensive ranges of aircraft batteries of all types and sizes were shown by Chloride Batteries, Ltd., Oldham & Son, Ltd., and Peto and Radford, Ltd.

BRITISH ASSOCIATION

The Birmingham Meeting

The annual meeting at Birmingham of the British Association for the Advancement of Science concluded last Wednesday (6th September). In his presidential address, Sir Harold Hartley, K.C.V.O., F.R.S., spoke on "Man's Use of Energy," and stressed in particular the vital part to be played by energy in solving the world's problems.

He said that, although it was only a century since man first understood the full import of the word energy and its significance as the driving force of all physical and chemical change and of life itself, it had been man's use of energy that had shaped so largely the material progress of the human race. Referring to man's personal need of energy, he said it was significant that no less than a quarter of the intake went to the brain, even when the organs of external sensation were at rest.

From the unsolved power engineering problems of the body Sir Harold turned to man's progress in the art of living, to the environment he had created for himself with its ever increasing call for energy. The world's reserves of coal were ample for centuries, but reserves of oil and natural gas were smaller although there was no reason to fear a shortage for some decades. Before then synthetic oil from coal and the huge reserves of oil in shale would provide substitutes. Reserves of metal might before long present a more difficult problem. There would be no lack of iron, aluminium and magnesium, although the cost of lower grade ores might rise. Reserves of copper, zinc, lead and tin were adequate only for some decades and if all the world used them at the same rate as the United States there might be a shortage within ten years.

Sir Hartley said that the global sufficiency of energy reserves was poor consolation for the countries that had few and it was this inequality of distribution that would make its transport of increasing importance in the future. Of equal importance was the need for greater efficiency in its use.

The possibility of transmitting electric power by high-voltage d.c. had passed the experimental stage and was awaiting development. By this means it should be possible to transmit large blocks of energy economically for perhaps a thousand miles by underground or submarine cable and thus link consuming centres with new and distant sources of hydro-electric power. There was, too, the possibility of linking the British and European grids, thus securing a better balance between capacity and requirements. Such a scheme offered us an opportunity to share in European co-operation without raising the problems of a supranational authority. The tides were another source of energy and if more courage had been shown in pre-war years in carrying out schemes like the Severn Barrage they might to-day be economical and saving fuel.

After mentioning the tantalizing amount of solar energy reaching the earth and the small use made of it, Sir Harold turned to nuclear energy and said that the problems of its peaceful uses loomed large. But it would be a tragedy if the fear of competition from nuclear piles were to delay the immediate development of more conventional sources of energy. The by-products and radiations of these nuclear plants were so dangerous that their operation was made possible only by automatic control.

This brought the president to the last chapter in man's use of energy, the new science of automechanisms, which could replace the human senses and control machines. These modern "robots" might seem to bring us nearer to the fear of Orwhom of the mastery of the machines but just as the machines were savers of labour, they could also relieve the human brain from much drudgery. He saw to-day the stirring of a new world consciousness that in time

must bear fruit, a new awareness of the load the modern Atlas had to bear, and the problems to be faced. The hope was in man's new understanding of Nature's processes, in his more efficient use of her resources and in the growing recognition of the dependence of one nation on another.

Automatic Control Systems

In Section G (Engineering) Professor A. Tustin dealt with progress in automatic control systems. He described a number of automatic controls that had been developed during recent years, including controls used in steel works, the automatic laying of guns and control of certain chemical processes. He continued by describing the possibilities of a wider use of automatic control in industry, and analyzed the principles and limitations underlying all automatic control systems. He showed that all such controls might be regarded as power amplifiers with feedback, and fundamental limitations to accuracy and speed of control arose from energy storages in the system. As an example he considered the particular class of control systems using d.c. machines and showed how the accuracy of control might be increased, but that there were limits to such possible increase.

Gas Turbines

Dr. A. T. Bowden presented a paper dealing with some aspects of the design, operation and economics of gas turbines specially suitable for electrical power generation. He confined his remarks to the open cycle type of engine which, he said, unless it could burn cheap oil, was unlikely to rival the steam turbine with coal-fired boilers for central power stations and its field as competitor with the diesel engine became very limited.

Dr. J. S. Clarke, who followed, said that combustion systems for gas turbines required high rates of heat release with minimum expenditure of pressure for the development of turbulence required for burning and mixing. He described two appropriate fuel injection methods: atomization of liquid fuel and pre-vaporization.

Presenting Technical Information

In a joint session with Sections A (Mathematics and Physics) and J (Psychology) on the presentation of technical information, Professor R. O. Kapp made a general survey of the subject and said that scientists gave a substantial portion of their working time to the spoken and written word. Hence, the standards to which the presentation of technical information should conform were as important as those for laboratory equipment if the scientist's work was to be done with maximum efficiency. He discussed various means for conveying technical information and suggested ways in which greater proficiency in exposition might be taught.

Circuit diagrams of complicated electrical and, more particularly, electronic apparatus are often difficult to follow because they are laid out with insufficient care. In a paper presented by Mr. L. Bainbridge-Bell the remedies for this state of affairs were discussed and some principles and artifices for clearer presentation detailed. The paper concluded with an example of the rearrangement of a typical circuit diagram.

FRENCH RAILCARS

The first of three a.c. 20 kV 50 c/s railcar/motor units designed for operation on the railway line from Aix-les-Bains to La Roche-sur-Foron in the Savoy Alps, which is at present in the course of electrification, has commenced trials in the French zone of Germany. These railcars are the first of their kind for operation at standard frequency on an a.c. system.

The railcars, which are being built by the French Railways, can operate singly or as multiple units and incorporate a new design of motor constructed to their own specification. The unladen weight of each unit is 48 metric tons. Each car is fitted with two motors, together representing 960 HP. The passenger section provides seating accommodation for 61 persons. Transformers and ancillary equipment are in a 9 ft by 7 ft compartment fitted as a mobile test bench. There is a driving cab at each end.

During preliminary trials a gradient of 1 in 18 was climbed at 40 m.p.h. Acceleration greater than 1 m/s/s on the level was obtained with an increase of 50 per cent of the normal current at the one-hour rating.

SMALL ARMATURE WINDING

Possible Scope for Economies

By S. F. Philpott, M.I.E.E.

Much has been written and spoken in recent years on the need for reducing costs and increasing productivity if we are to retain and expand our export markets. Severe competition is being met by all branches of industry. It is particularly strong in the case of domestic, commercial and industrial appliances driven by small motors, in which America with its larger home market permitting greater production, together with an eagerness to invent and use factory labour-saving devices to the full, has secured a large share of the world's markets on price alone.

In setting out to reduce the cost of a product it is logical to start with the largest items because this presents the greatest scope. The armature is the most costly unit in any motor because its building and winding always involves a certain amount of handwork which is expensive. The materials, too, are relatively dear.

Two Winding Methods

Two methods of winding small armatures are in general use, viz., former winding and machine winding. In the former method the coils are wound separately, taped all round with superfine or silk tape and inserted one at a time into the slots of the core, which are insulated to receive them. Sometimes the taping is done by machine but the insertion of the coils is essentially a hand operation. In machine winding the wire is wound directly into the insulated slots.

All the coils of a former winding are similar in size and it follows that a former-wound armature is in reasonable mechanical balance and the resistance of each coil is similar. The first coil of a machine-wound armature lies close to the core, and succeeding coils are laid one over the other with the result that all the coils differ in length, resistance and weight, and the armature is electrically and mechanically unbalanced. In practice, the result of electrical unbalance is imperceptible, while mechanical unbalance can be corrected rapidly by using a modern balancing machine.

The only real advantage of the former-winding method is that the tape which binds the coils gives additional insulation between the top and bottom layers of the winding. Against this, many thousands of machine-wound armatures are produced every week without any inter-coil insulation other than that afforded by the covering of the wire, and breakdowns are very rare.

Economically, the machine-made armature is by far the better proposition because if the time of actually winding the coils is considered to be the same in both cases, then the time for taping the former-wound coils and inserting them is a total loss if no material improvement in quality is obtained by former winding. The capital outlay for machine winding is higher than for former winding by the amount of the rather more intricate head needed to hold an armature over that required for a coil former.

Types of Winding Machines

The type of armature-winding machine depends on the amount of work to be done. For small quantities or repair work a hand-operated machine is good enough. Efficient methods can be applied even to a hand machine and it is surprising what a difference in output can be obtained from a machine in which there is a step up gear of say 1 : 5 ratio between the handle and the rotating head over one in which the handle is on the same shaft as the armature. A number of different types of power-operated armature-winding machines are available, ranging from the simple head to the fully automatic type.

A production armature-winding

machine should run fast, stop dead automatically when the correct number of turns have been put on, and in the right position for making the leads. It should attain full speed instantaneously and should be designed so that it is not dangerous to the operator.

One point which requires consideration in connection with the economics of machine winding is the number of wires which shall be wound at a time.

Generally in small armatures there are two or three times as many commutation segments as there are slots. Each slot contains, therefore, two or three sections. These can be put on by winding three wires of different colours in parallel or by using one wire only and winding the first section, making a loop, winding the second section, bringing out a loop and then winding the third section to complete the coil.

At first sight it would appear quicker to wind with three wires in parallel. The winding head has then to make only one-third the number of turns that it would in winding the three sections in succession. However, as the number of turns in an armature section is usually small, the duration of actual winding is short.

If an armature has 50 turns per section and the machine runs at 500 r.p.m. only one-tenth of a minute is taken to wind three sections together, or three-tenths of a minute when winding each coil in succession In practice many machines run at even higher speeds.

Connecting the Leads

The greatest time in completing an armature is spent in connecting the leads to the commutator.

In the multi-wire method the end of each section has to be connected to the starting end of the next all round the armature, a process which involves the sorting out of the ends in the correct sequence (red-white, white-green, green-red, etc.) and twisting them together before connecting to the commutator. This is quite a long and tedious job and open to mistakes in connecting. In the single-wire method while the actual winding time is longer, there is no break in the wire, and the leads are produced in the correct sequence ready for connecting. Further, in the single-wire method, the leads need not be twisted: thus the risk of breakages and open circuits is reduced. Single-wire-wound armatures can be tested for continuity in one operation before connecting up.

The single-wire system has so many advantages over the multi-wire method that it is almost always used in machine winding, and where it is not used its adoption will show a considerable saving over the old method, once the operators have become used to the idea.

The number of commutator bars per slot can sometimes be reduced with advantage so far as cost is concerned. Electrically, three sections per slot give better commutation than two sections but the amount of sparking is controlled by many factors besides the number of bars; it may be found that two sections are just as good as three, and sometimes even one section per slot can be used.

The economic advantage, of course, is that not only are the commutators cheaper because there are fewer segments and separators to be made and inserted but the number of leads to be inserted into the commutator is reduced by one-third - affording a very considerable reduction in connecting time and cost.

Various Insulations

Then there is the question of the type of wire. The best all-round insulation for the wires of small armatures is probably double silk, with a layer of enamel on the wire itself, but it is also the most expensive. Cotton covering is cheaper but takes up more space. The cheapest covering of all is enamel, but this is not generally considered reliable for armatures on account of its liability to pinholes, lack of resistance to abrasion and the fact that it is liable to be softened by impregnating varnish. In the opinion of the writer the use of ordinary enamel-covered wires should be restricted to non-rotating windings.

The synthetic-covered wires, marketed under various trade names, are a different proposition. They are much cheaper than the textile coverings. They have a good dielectric strength, high resistance to abrasion, generally resist attack by varnish solvents, or at least it is usually possible to find a varnish which agrees with a particular make. The insulation coating is thinner than silk, so that the wind-

ing takes up less space, an advantage which can help to reduce the size of the armature and motor, or to make the winding easier for the subsequent operation of wedging, etc. The covering is also non-hygroscopic.

All the advantages set out above point to this material being the ideal, both economically and electrically. It was used largely and successfully during the war. Unfortunately, after the war a deterioration set in, not confined to any one make but due, so it was said, to a faulty imported constituent common to all makes and a spate of trouble occurred. Matters were quickly put right but not before considerable loss of goodwill had occurred, with the result that some manufacturers are still reluctant to use it, although others are using it with entire satisfaction.

Trouble Due to Wrong Choice

Some of the early trouble was undoubtedly due also to the lack of appreciation of the fact that most makes of synthetic-covered wire were available with four different thicknesses, and it may be that in some cases the thinner coverings were inadvertently chosen rather than the thicker type which would appear desirable for armatures. The writer will offer no opinion except to point out the obvious economic advantage of using this material in the hope that perhaps other engineers will give their experiences of its use.

Equally important with material and labour costs is the question of overheads and their allocation. Overheads include all those shop expenses, supervision, labour and miscellaneous materials not accountable to any particular job, lighting, heating, power capital charges, rates (proportional to floor space occupied) and, of course, a share of the administrative and sales costs.

In making up a cost or estimate, overheads are generally allocated as a percentage. If allocation is strictly on a shop basis this system may be considered reasonably satisfactory if the output is fairly regular - remembering that most of the charges making up the overheads are fixed irrespective of the output. If, however, the overhead percentage is an overall figure applying to the whole of a works, as is by no means unknown, then there may be an unfavourable reaction on the winding department which may result in enhanced cost (on paper), a swollen estimate of the winding cost and a lost order.

As mentioned previously, winding labour is generally the largest item of expense, so the winding department may have to bear the greatest share of the overheads; yet even in a well mechanized winding department the cost of the machinery and plant installed, and the cost of running it, is small compared with a machine shop of equivalent size and it is obviously unfair to the winding department as a whole that it should have to carry the same overheads.

The space occupied by winding personnel and equipment can often be reduced. Too often one sees uncompleted work taking up valuable floor space which is charged to shop overheads. Benches also may be too wide and become littered as only a winding shop bench can become littered. Generally, saving of space, with attendant economy in lighting and heating can be accomplished by keeping work on the move and by providing only sufficient bench space as is required for the operator to do his or her job efficiently and comfortably.

Finally, and it may be obvious, but nevertheless necessary to mention, care should be taken to ensure that economies in method, material and floor space are duly reported back to the cost and estimating departments, otherwise their value is lost so far as reducing the cost of the product is concerned.

ELECTRICITY BEFORE WATER

A meeting was held a week or so ago down in Normans Bay, which is in Sussex, in response to the inhabitants' demand for a supply of electricity. It was reported that the requisite number of prospective consumers was forthcoming to make an extension feasible. Thereupon Mr. G. H. Ingamells, representing the South Eastern Electricity Board, said that the Board hoped that sufficient use would be made of the service to justify the expenditure. He particularly mentioned the advantages of cookers and water heaters. His reference to water heaters raised a laugh; the village has no water supply. Consequently in arranging an exhibition of appliances in the village the Board was careful to omit immersion heaters.

INDUSTRIAL FINISHES EXHIBITION

At the Industrial Finishes Exhibition held at Earls Court, London, examples of various finishes available and their suitability for different purposes were shown in a central technical exhibit, separate sections dealing with natural metal finishes, plated finishes, hot dipped coatings, sprayed metal finishes, vitreous enamel, organic finishes and the anodising and dyeing of aluminium. Indications were given of the precautions manufacturers should take in specifying the basis metal and in designing the article concerned. Instruments used for testing finishes were included in the British Standards Institution's display.

Samples of recent developments in metal finishings shown by the Council of Industrial Design included a chromizing process which changes the surface of mild steel articles into stainless steel, a tin-zinc electroplate which protects against sea water and tropical humidity and can be given a bright or matt finish, a vitreous enamel entirely free from lead and suitable for use on aluminium, a new high-temperature resisting vitreous enamel finish and a new enamel plating. In conjunction with the Council, the Vitreous Enamellers' Association has produced a booklet on vitreous enamelling explaining common faults in design and suggesting how they can be avoided.

The new methods of remote resistance control, automatic time control of plating and cleaning cycles and time contro led current reverse units of capacities up to 1,500 A were demonstrated by M.L. Alkan (Sales) Ltd., and Silvercrown, Ltd., displayed a new type resistance board, a plating rectifier with remote control, a heavy duty mild steel rumbling barrel and a totally immersed plating barrel. Grauer & Weil Ltd., also showed two new plating barrels.

Among new Jenolite products were an aluminium degreaser and cleaner, a paint stripper, a powder degreaser, soldering solutions, a de-scaler for stainless steel, black finishes for iron and steel and an aluminium keying solution. The new range of "Polychen" styrenated finishes was shown by Lewis Berger (Gt.Britain) Ltd. Keith Blackman Ltd., exhibited drying, air circulating, fume and dust removal plant.

Included in the exhibition catalogue are thirty-nine pages devoted to articles on technical aspects of various industrial finishes.

BRITISH FOOD FAIR

Electricity is well to the fore at the British Food Fair which, until Saturday next, is being held at Olympia, London. A reproduction of the "Cooking Laboratory" of Mr. Philip Harben, the B.B.C. Cookery expert, is arousing a great deal of attention on the British Electrical Development Association's stand where there is a theatre accommodating about forty people for demonstrations and lectures on frozen food, vegetarian and cold cookery, and fruit bottling (with particular reference to simmer controls on electric cookers). Between demonstrations, films are shown of the use of electricity in food preservation and preparation. The E.D.A. exhibit also includes a glass panelled preparation kitchen and a display of some of the latest kitchen equipment, including items of special interest to caterers.

The application of electricity to food preservation, storage and distribution is stressed on the Department of Scientific and Industrial Research stand with exhibits relating to spray drying of milk, keeping fish fresh by refrigeration and smoke curing, and preserving apples by gas storage. Frozen food manufacturers are much in evidence and a model of an installation carried out by the S.B. Engineering Co., Ltd., is to be seen on the stand of Smedley's Ltd. The storage of food in clean and healthy conditions is the keynote of the Electrolux display.

Fruit cleaning, chocolate refining, milk pasteurising, metal detecting, filling, bottling, wrapping and capping machines are other appliances demonstrated in which electricity plays an important part. As a further aid to educating the public in nutrition, use is being made of "Lumena", the life-size transparent woman, which incorporates 30 lamps (served by 393 ft of cable) to illuminate the organs of the body.

ELECTRONICS SYMPOSIUM

Scientific Instrument Makers and Industry

The third annual symposium on the application of electronic techniques to the solution of research and industrial problems was held from 5th to 8th September, by the Electronics Section of the Scientific Instrument Manufacturers' Association at the Examination Hall, Queen's Square, London, W.C.2. As last year, the symposium was accompanied by a compact and specialized exhibition of electronic instruments in which some twenty manufacturers displayed their products.

The rapid progess made in telecommunications engineering during the last decade has been matched by the ingenuity of the instrument designers and a substantial range of instruments was on view. Continued interest in the application of electronic methods to nuclear physics and its associated processes was well brought out by exhibits which have been developed in recent years and included rate meters, scalers, counters and health meters.

Electronic science is making ever greater penetration into industrial processes and much new equipment is now available. Among the instruments on show were potentiometers, recorders, radiation pyrometers, pH meters and a wide range of temperature control equipment. Much research equipment was also to be seen and in addition to the last equipment for high vacuum work, there was a good selection of apparatus for physical measurements.

Study of Surfaces

The symposium was officially opened on Tuesday afternoon by Sir Ben Lockspeiser, F.R.S., and after the ceremony Professor G. I. Finch, F.R.S., read a paper on some industrial applications of electron optics with particular reference to the study of surfaces and their properties. He explained that it had now become possible for the first time to ascertain directly the nature of the atoms and their arrangement in surfaces and also to map out surface texture to a detail which approached atomic dimensions. It would be difficult to exaggerate the importance to industry of such a searching probe.

On Wednesday morning Mr. W. Bamford (Everett, Edgcumbe & Co. Ltd.) spoke on the recent improvements in direct recording considering the apparatus for this purpose under two headings: the driving movement and also the marking device. He said that improvements in driving movements had been towards higher speeds of moving coil elements with better control of damping characteristics and the increase of facilities of the servo-operated types with their wide charts and multiple records. The limit of frequency response of direct recorders was discussed and reference made to a multi-pen device operated from a supersonic switching mechanism. Amongst marking devices, improved ink-on-paper recorders were mentioned and also details of electrical discharge papers and their applications.

Measuring Small Quantities

In the afternoon Mr. R. Y. Parry and Mr. H. W. Finch (E. K. Cole Ltd.) described a simple vibrating condenser electrometer for the measurement of small direct currents and voltages at high impedance. The full-scale sensitivity may be 3 x 10^{-14} A or 30 mV and fluctuations of zero correspond to about 10^{-15} A or 1 mV from day to day under normal laboratory conditions. Applications to ionization current measurements were discussed, including beta particle and gamma ray measurements. The use of the instrument for measuring pH was also discussed. The next paper, by Mr. G. I. Hitchcock (Electronic Instruments Ltd.) comprised a review of trends in pH meter design. He described the wide range of available circuits with particular reference to the advantages and limitations of both the d.c./a.c. convertor and the automatic correction types of instrument. It was suggested that the most satisfactory solution might be

the combination of at least two or the available methods rather than an extreme development of any one, and reference was made to Continental and American practice.

The paper concluded with a description of the practical difficulties which followed the economically inevitable use of ordinary commercial components and means were suggested for overcoming or minimizing these difficulties. Throughout the paper it was borne in mind that these instruments were usually operated by engineers who might be unacquainted with electronics.

Electronic Counting

Some aspects of electronic counting were considered on Thursday morning by Mr. J. McG. Sowerby (Cinema Television, Ltd.) who described a variety of circuits beginning with a scale of two. He showed how ring counters could be derived from the scale of two and how counters of any scaling factor, including large prime numbers, might be constructed from more elementary circuits. In conclusion, a description was given of the applications of these circuits to frequency division, the measurement of short time intervals and of frequency.

The beta-ray thickness gauge and its industrial applications were dealt with in the afternoon by Mr. C. Syke (Baldwin Instrument Co., Ltd.), who began by explaining that radioactive isotopes emitted ionizing radiations which were progressively absorbed (attenuated) in passing through matter, the ratio of transmitted to incident radiation being a function of the quantity of matter traversed. This ratio could be accurately measured by simple electronic instruments calibrated in terms of weight per unit area or directly in terms of thickness for any material of a given density. In addition, a balance indicator showed the deviation from a pre-set weight or thickness.

The electrical output of the instrument was sufficient to drive recorders or servo mechanisms for automatic process control. Applications to textile, paper, rubber, plastic, metal and other industries were described and illustrated and the physical properties of the beta radiation from isotopes, preparation of sources, hazards, and safety measures associated with their use, and the performance of the gauge were discussed. The author concluded by indicating various trends of development such as the use of gamma rays for gauging heavy metals of considerable thickness.

The final paper of the symposium was delivered on Friday last by Mr. J. K. Brimley (Nobel Division, I.C.I.), who discussed user problems in instrumentation. Electronic instruments for industrial use have to be designed for factory conditions and the design problems involved often require co-operation between the electronics specialist and the plant operator. Some minor criticisms of commercial instruments were made and special purpose instruments illustrated by two demonstrations.

B.E.A. CONTRACTS

During August the British Electricity Authority placed contracts for equipment for power stations, switching and transforming stations and transmission lines valued at £2,793,386. They included cables, interconnections and earthing system, Plymouth "B" power station, Siemens Bros. & Co., Ltd.; electrostatic precipitation plant, Drakelow power station, near Burton-on-Trent, Sturtevant Engineering Co Ltd; formation for private sidings accommodation, locomotive shed, turntable etc., Hartshead power station, Cheshire, James Berry, Ltd., site levelling, construction of embankments and ancillary works, Fleetwood power station, M.J. Gleeson, Ltd; buildings and river-works, Littlebrook "C" power station, Dartford, Holloway Bros. (London), Ltd; structural steelwork for boiler house, Huddersfield power station, Heenan, Beddow and Stormey, Ltd; foundations for pump chambers, screen chambers and drainage pump for circulating water pump house, North Tees power station, Sir Robert McAlpine & Sons (Newcastle-on-Tyne), Ltd; 132 kV 2,500 MVA switchgear, Fraddon substation, Devon, General Electric Co., Ltd; 90 MVA 132 kV reactors, Hams Hall power station, Birmingham, English Electric Co., Ltd; 132 kV overhead lines, Macclesfield substation, East Yelland-Fraddon, (Devon) and Staythorpe-Grantham-Boston and 132 kV overhead line entries, Carmarthen Bay, British Insulated Callender's Construction Co., Ltd; 132 kV 2,500 MVA switchgear, Macclesfield substation, English Electric Co., Ltd.

COMMERCE AND INDUSTRY

Ferranti's and Seattle Contract

German-Indian Trade Agreement

Another tender for transformers for the Seattle City Light Co. has been put in by Ferranti, Ltd Their price for six transformers was £582,000, the lowest submitted. The next lowest was that of the American General Electric Co , £1,098,000. The specification called for delivery of three of the transformers in 330 days and the rest within 360 days but the company could only offer 1,060 and 1,250 days. According to the Seattle correspondent of the Daily Telegraph, the purchasing agent, Mr.P.Hendrick, said that although it would appear that the British tender would have to be rejected it was hard to ignore the great difference in price and he wanted to talk to the company's superintendent before the contract was awarded.

New Iron and Steel Order

Under the Iron and Steel Prices (No. 3) Order, 1950, signed by the Minister of Supply, the maximum prices of a limited range of iron and steel products are amended. The principal alterations are increases in the maximum prices of electrical sheets, wire and wire products. The Order came into force on 29th August.

Television in Australia

The Australian Postmaster-General Mr.H.L.Anthony, announced last week that tenders for the provision of a television service in Australia would be called in Australia and from overseas within two weeks. He stated that specifications would be air-mailed to Britain and other overseas countries, but it would not be much use calling for tenders from the United States because expenditure on American equipment would involve dollars. Mr. Anthony said that some British firms produced American television equipment under licence from the United States and no doubt that equipment would be available should any such tender be accepted.

By the provisions of the Australian Broadcasting Act the Federal Government would be the sole operating agents when television was first introduced but the Government intended to amend the Act to enable commercial television to be established.

Gas Space-Heating Appliances

The Treasury has made an Order entitled The Purchase Tax (No 8) Order, 1950 (Statutory Instruments 1950, No. 1444), the effect of which is to reduce the tax on space heating appliances of a kind used for domestic purposes in which the heat is supplied by gas and its distribution assisted by electric fans or electric pumps which consume in all not more than 100 W These appliances have been chargeable at 100 per cent as space heating appliances suitable for operation from the electric mains but now become liable at the same rate as domestic space heating appliances wholly operated by gas, viz. 66 2/3 per cent.

Hydrogen-Cooled Alternators

Contracts recently placed by the British Electricity Authority with the General Electric Co., Ltd., include, three 60MW, 11.8kV, 3,000 r.p.m. hydrogen-cooled turbo-alternators. Two of these sets are for a new power station to be erected at Ince, near Capenhurst, in the Wirral Peninsula,

for the Merseyside and North Wales Division; the third set is for a further power station which will be built at Birmingham to be known as Hams Hall "C". The equipment will be designed and built at the company's engineering works at Witton and Erith, where six further 60MW hydrogen-cooled sets are at present under construction for the Uskmouth power station, near Newport (Mon).

Copper Prices Raised

The Ministry of Supply has announced an increase in the price of copper of £16 a ton from 1st September, from £186 to £202 per ton delivered. The Ministry has also announced that from 4th September its buying price for rough copper in slabs of from 2 to 3 cwts has been increased from £144 to £156 per ton.

German Accessories in South Africa

Electrical accessories from Western Germany, made to British Standard Specifications, are now on offer in South Africa, where they are being handled by a Johannesburg concern. The range includes lampholders, all types of switches, and a large number of domestic and commercial fittings. As Western Germany is regarded by the Union Government as a "soft currency" area, such imports may be paid for with sterling.

Shipbuilding Regulations

The Minister of Labour and National Service has published a preliminary draft of revised Regulations under the Factories Acts for shipbuilding and ship-repairing. (H.M. Stationery Office, 9d). Revision of the existing Regulations has been in contemplation for a considerable time. A committee, on whose recommendations the Shipbuilding Regulations of 1931 were based, urged that their recommendations should be applied to the repair of ships afloat in public wet docks and harbours, as well as in shipbuilding-yards and public dry docks, and that the scope of the Regulations should be extended accordingly when amending legislation had been passed enabling this to be done. Such legislation was included in the Factories Act, 1937.

The Ministry has circulated copies of the draft to organisations concerned and has invited them to send to the Ministry, in three or four months' time, statements indicating which points on the preliminary draft they would like to discuss with representatives of the Ministry. Following these discussions, it is intended to prepare a revised draft for formal publication.

Lead Price Increase

The Ministry of Supply announces that from 2nd September the price of good soft pig lead has been increased by £8 to £112 to £120 per ton delivered.

German Exports

Particulars of the trade agreement of 4th July between the Government of India and the Government of the Federal Republic of Germany are given in "Indian Trade and Industry". Included as a schedule is a list of the proposed exports from Western Germany to India for the year 1st July, 1950, to 30th June, 1951, with dollar values. Among the classes specified are the following: Electrical machinery and parts, $6,350,000; special electrical and electromedical equipment, $250,000; steam turbines and spares, $500,000; switchgear, $350,000; telephone equipment, mainly spares, $20,000; tubular steel poles, $100,000; and wiring accessories, insulation and installation material, $100,000.

The agreement provides that the German Government shall facilitate employment of German technicians and specialists in India and afford assistance "wherever possible and necessary", for the training of Indian technicians in Germany.

Indian Telephone Production

According to "Indian Trade and Industry" of 11th August, nearly half of the 365 component parts of a telephone are now being made at the Indian Telephone Industries factory at Bangalore (Mysore) and up to date

22,000 instruments have been turned out. In under three years, it is said, the factory will be producing all the telephone and telecommunications requirements of the country. The capital of the company is held as to 20 per cent by the Mysore Government, 10 per cent by the Automatic Telephone and Electric Co. (England) and the rest by the Government of India.

C.P.R.E. Conference

The twelfth national conference of the Council for the Preservation of Rural England is to be held at Tunbridge Wells from 19th to 22nd October. On 20th October Mr. C.T. Melling, M.Sc., M.I.E.E., M.I.Mech.E., Chairman of the Eastern Electricity Board, will address the conference on "Problems of Rural Electrification".

Simplification in British Industry

Following the publication last November of "Simplification in Industry", the Anglo-American Council on Productivity has now issued another report on "Simplification in British Industry". The report states that the electrical manufacturing industry was among the first to pursue a policy of standardization and interchangeability and there are committees dealing with standardisation working actively in collaboration with the British Standards Institution in each branch of the industry. Standardization has played a notable part in increasing production and lowering costs in the lamp industry; this and simplification have made possible the wide installation and continuous development of automatic lamp-making machinery. Since 1921 productive efficiency has increased by 120 per cent as a result of these changes.

Pocket Reference Book

We have received a copy of an attractively produced pocket book entitled "The Electrical Engineer's Companion" from the London Electric Wire Co. and Smith's, Ltd. This is the second edition of a reference book containing facts and formulae relating to bare and insulated wires and electric cables, together with a wealth of useful information concerning general, mechanical and hydraulic engineering. Copies can be obtained from the company at 24, Queen Anne's Gate, London, S.W.1 (Price 5s.).

Australian Notes

The formation of a joint organisation (Commonwealth and private enterprise) to develop large hydro-electric projects for industry in New Guinea has been announced by the Minister for National Development (Mr. Casey).

The South Australian Government statistician reports that during the nine months ended 31st March, 1950, imports into that State of dynamo-electric machinery were valued at £1,421,655 compared with £922,010 in the nine months to 31st March, 1949.

The Minister for Trade and Customs has referred to the Tariff Board for inquiry and report the question of what rates of duty should be imposed on covered cable and covered wire under Tariff Item 181 (A) (I) (a).

Motors for United States

Mr. W.W. Grainger, president of W.W. Grainger, Inc., Chicago, has just concluded a week's visit to Newman Industries, Ltd., Yate, Bristol, and before leaving he placed an order for electric motors to a value of $200,000.

Change of Name

Clear Glass Products, Ltd., has changed its name to Corrosion, Ltd.

Miners' Lamps

The Ministry of Fuel and Power has revised Testing Memorandum No. 1, which deals with the testing for approval of safety lamps, including separate requirements for lamp bulbs and flame safety lamp glasses, and it is now available from H.M. Stationery Office, price 6d. This, the third edition, details the requirements imposed by relevant regulations; also the testing procedure

and conditions of approval of such lamps for use in mines. As in previous editions, full design and constructional particulars are given in appendices.

Trade Announcements

J.H. Tucker & Co., Ltd., announce the appointment of Mr.H.Finch as sales engineer in the North-East England area, in succession to the late Mr. A.R. Page. He will continue to cover company's interests in the North-West area. His address is Sefton Hey, Phillips Lane, Formby, Lancs.

Thomas Handley & Co., Ltd., 74, Wellington Street, Leeds 1, have been appointed by the receiver of the Nox Electric Lamp Co., Ltd., as sole distributors for the sale of Nox candle lamps.

The sales and administration offices of the Stella Lamp Co., Ltd., have been removed to 37-39 Oxford Street, London, W.1, (telephone: Gerrard 8315).

The sales control offices at Longbridge and the London branch offices at Holland Park Hall of Austin Crompton Parkinson Electric Vehicles, Ltd., have been transferred to 95-99 Ladbroke Grove, London, W.11, (telephone: Park 8070).

The London Fan & Motor Co., Ltd., has appointed Mr.J.Eagles, 51, Navigation Road, Altrincham, to represent the company in Lancashire and Cheshire, and Mr.J.Laing, 65, West Regent Street, Glasgow, C.2., as representative in Scotland for "Breeza" and "Trojan" fans.

Industrial Administration

A ninth series of lectures on higher management has been organized by the Institute of Industrial Administration, to take place shortly at the British Institute of Management, Management House, 8 Hill Street, London, W.1. Entitled "Policy: The Foundation of Management", these lectures will be delivered by Messrs. E.F.L.Brech, B.Sc.(Econ), M.I.I.A., and Donald McDonald, B.Sc., F.I.M., F.I.I.A., on Wednesdays, 27th September, and 4th and 11th October, at 6.30 p.m. Tickets for the complete course are available, price 21s from the Hon. Secretary, Institute of Industrial Administration, London Centre, 44 Horn Park, London, S.E.12.

Educational

Particulars are now available from the head of the Electrical Engineering Department of the South East London Technical College of courses in various branches of electrical engineering.

The prospectus of evening courses in electrical engineering, including telecommunications, for the 1950-51 Session at the Polytechnic, 309, Regent Street, London, W.1, is now available and can be obtained on application to the head of the Electrical Engineering Department.

A five-day vacation school to review the control of electrical machines will commence on 18th September at the Imperial College of Science and Technology, South Kensington, S.W.7.

Catalogues and Lists

W. Canning & Co., Ltd., Great Hampton Street, Birmingham. - 97-page technical booklet giving instructions for preparing articles for electrodeposition, and details of how to make up, operate and use the various plating solutions in common use.

H.J. Baldwin & Co., Ltd., Baldwin House, 132, Arkwright Street, Nottingham. - Catalogue of cable protection covers, electrical stoneware, underground disconnecting boxes, feeder and distribution pillars, pole mounting boxes and cable box accessories and jointing materials.

Dexray Engineering Co., Ltd., Brock Street, Lees Street, Manchester, 1. - Catalogue of l.v. switch and fuse gear.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.1. - Technical folder on electric soil warming equipment.

Ransomes & Rapier, Ltd., Waterside Works, Ipswich. - Folder on petrol-electric shop truck cranes for loads of 1 to 5 tons.

PROSPECTS IN PAKISTAN

Opportunities for British Manufacturers

The development of electric power is thought to provide a most promising field for the stimulation of trade between the United Kingdom and Pakistan. Stating this in its report to the President of the Board of Trade (H.M.Stationery Office 7s), the United Kingdom Industrial Mission to Pakistan says that British consulting engineers, in addition to the work being done at present on project reports, can play an immediate and essential part in designing and supervising the power schemes on the Pakistan Government's programme.

Lack of electric power is said to be one of the principal factors hampering industrial development and the need for the expansion of the country's power supply is therefore of paramount importance. Pakistan suffers from a shortage of natural fuel. Despite the great distances between the sources of water power and some of the more important industrial areas such as Karachi, it would appear that the long-term development of the considerable hydro-electric resources, rather than thermal power, is necessary to the country's economy. A general scheme for power development is being prepared by the Government's advisers, Mers, Rendel, Vatten (Pakistan), a combination which includes the two British firms of consulting engineers, Merz & McLellan and Rendel, Palmer & Tritton.

At the time of the Mission's visit the only water power plant in commercial operation was at Malakand in the North West Frontier Province, where the three turbo-generators have a total installed capacity of 9,600 kW. Extensions consisting of a further two 5,000-kW sets are well advanced and these units should be in operation later in the year. The Rasul water power plant (22,000 kW) should be completed by the end of 1951 and the Dargai scheme (20,000 kW) in 1953. The new hydro-electric projects at Mianwali, Karnaphuli and Warsak with installed capacities of 20,000 kW, 40,000 kW and 105,000 kW respectively are expected to be ready by 1954, 1955 and 1956. The total capacity of all the thermal stations, diesel and steam, including Karachi, is believed to be between 40,000 kW and 50,000 kW: extension schemes in hand will add about 40,000 kW.

The Government's programme seeks to develop the hydro-electric resources of the North West Frontier and Punjab provinces only. Karachi, which is 600 to 800 miles distant, must therefore remain for some time at any rate a thermal station area only, as the transmission costs would at present appear prohibitive. The Mission suggests, however, that the water power resources of the rivers to the west of Karachi might be investigated. An estimated deficit of 100,000 kW during the construction of the projected power schemes could be met by the efforts of British manufacturers in supplying temporary and permanent plant and by British contractors in installing it.

Pakistan is an important market for electrical equipment (including prime movers) of all types and there will be an increasing demand for all electrical supplies and apparatus and particularly refrigerators, fans and all domestic appliances as adequate supplies of electricity become available. Competition from most manufacturing countries is keen and the energetic entry of Japanese makers of electrical and engineering plant

at most competitive prices and delivery is very noticeable. Several important contracts for generating sets and other steam and electrical equipment have already been placed with Japanese manufacturers.

In the opinion of the Mission, the development of the country does not warrant the establishment of works for the manufacture of heavy machinery and electrical equipment. There are, however, good prospects for the manufacture of light products and supplies for which a growing demand is likely and there are in fact already a number of small assembly or manufacturing plants operating. British manufacturers of such products would be well advised to consider forthwith establishing small plants in Pakistan which can be expanded to cope with the growth in demand as it takes place.

Among the members of the Mission was Mr.E.C.Holroyde, vice-chairman of Crompton Parkinson, Ltd.

PERSIAN ELECTRICAL MARKET

In a report to the Board of Trade on the market in Persia for domestic electrical appliances, the Counsellor (Commercial) Tehran, says that the demand is growing and will expand further when power development schemes under the seven-year plan get under way. Imports of irons, hotplates, cookers, etc., have risen during the past twelve months but retail sales have declined as a result of the general trade recession and the market is well stocked.

There is little change to report in the small market for vacuum cleaners, where United Kingdom products have held their ground. One local distributor has sold washing machines of United Kingdom manufacture. This type of electrical equipment is still much of a novelty in Persia and sales require energetic promotion.

Since devaluation, prices for United Kingdom ceiling and table fans have become competitive, except with those offered from Japan at prices about 12½ per cent lower than the British. No Japanese fans have actually arrived yet but attractive catalogues have been sent by many Tokyo firms to importers. Recently a demand for ceiling fans has sprung up for installation in Government buildings and new office blocks, for which purpose orders have been placed for several hundreds. Once they begin to be used, it is anticipated that they will become popular. As fans are required only in June, July and August, they are imported during the winter in readiness for spring sales.

Imports during the Persian year 1327 (21st March, 1948, to 20th March 1949) were as follows: Fans £56,000 (from the United Kingdom £11,000; United States £35,000); dry batteries £43,000 (U.K. £8,000; U.S.A. £33,000); accumulators £102,000 (U.K. £65,000; U.S.A. £33,000); heaters, cookers, irons and all electro-thermic apparatus £43,000 (U.K. £26,000; U.S.A. £13,000); electric lamp bulbs £55,000 (U.K. £14,000; U.S.A. £25,000); other domestic appliances £5,000 (U.K. £3,000; U.S.A. £1,900). Quotas for the current Persian year are as follows: £770,000 for all electrical appliances, batteries, spark plugs, wiring equipment and cables, h.v. insulators and medical electrical apparatus.

Electrical Commercial Travellers

The annual dinner-dance of the Electrical Trades' Commercial Travellers Association will be held on 6th October at the Café Royal, Regent Street, London, W.1. Tickets 27s6d each) can be obtained from the hon. entertainments secretary, Mr.H.Bowen, 69, Warwick Gardens, London, W.14.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

REPORTS AND DIVIDENDS

Murex Ltd., report a consolidated trading profit for the year ended 30th April last of £905,494, as compared with £874,268 for the preceding year. After meeting various charges, including £137,252 depreciation of fixed assets and £398,444 for taxation, there is a net balance of £369,496 (against £311,550, to which is added £127,645 brought in making £461,141. General reserve receives £210,000, and it is proposed to pay an ordinary dividend for the year of 10 per cent on doubled capital (against 20 per cent) The balance carried forward is £130,416

The Nigerian Electricity Supply Corporation, Ltd., reports power sales for the year to 28th February last of £214,122, as compared with £205,513 for 1948-49, and a net profit of £118,672 (against £112,782). Taxation requires £57,884, and general reserve receives £30,000. The distribution for the year is maintained at 10 per cent, by a final dividend of 4 per cent and a bonus of 2 per cent. The balance carried forward is £22,172 (against £21,559 brought in).

Berry's Electric, Ltd., report a trading profit for the year ended 31st March last of £84,464, as compared with £64,235 for the previous year, to which is added £932 interest on investments, making £85,397. After deducting depreciation, etc., there is a net profit of £60,600 (against £45,919). General reserve receives £17,000, deferred repairs £2,000, and taxation requires £28,402 It is proposed to repeat the ordinary dividend of 12½ per cent and to carry forward £10,061 (against £9,557 brought in).

Hackbridge Cable Holdings, Ltd., reports a consolidated trading profit for the year ended 31st March last of £274,437, as compared with £259,898 for 1948-49. Taxation absorbs £151,437 leaving a combined net profit of £123,000 (against £115,187), to which is added £3,652 brought in, making £126,652. It is proposed to pay a final ordinary dividend of 12½ per cent., making 20 per cent for the year. The profit retained in the accounts of the subsidiary companies is £61,330, and the balance carried forward by Hackbridge Cable Holdings is £3,447. In his statement issued with the report and accounts, Mr. C.I. Steen (chairman), says that the turnover for the year under review showed an encouraging increase in all departments. At the same time, owing to factors outside their control, costs had continued to rise with a consequent narrowing of their profit margin. Turnover for the first four months of the current year had been satisfactory, although lower than twelve months ago.

The Sterling Cable Co., Ltd., held its annual meeting on 31st August, Mr. J.S. Clark (chairman and managing director) presiding. In his statement issued with the report and accounts the chairman said that the year under review had not been easy towards the middle of the period it became apparent that heavy cuts in capital expenditure by the British Electricity Authority and other Government-controlled undertakings would have serious repercussions on the cable industry. Export trade was not assisted by devaluation, prices of controlled materials were kept in equilibrium with American home prices, and competition began to be felt from Germany, Japan and Italy. Despite these difficulties their export turnover represented 50 per cent of their output. A fire at their Aldermaston premises in January last adversely affected trading profits of the rubber and plastic insulating section for the months of February and March. They were maintaining their output and at the present stage their turnover was slightly above last year, although their rates of profit had been reduced.

A.C.Cossor, Ltd., report a group profit on trading for the year ended 31st March last of £240,555, as compared with a loss of £78,615 for the preceding year, to which is added income from trade investments £2,989, and interest received £4,216 making £247,760. After deducting charges, there is a group net profit of £150,056 (against a net loss of £221,718). taxation requires £48,300 and profits of a subsidiary applicable to outside shareholders £7,106 and after adding £5,740 provisions made in previous years not required the debit carried forward is reduced from £195,896 to £96,526.

In his address circulated with the report and accounts Lord Burghley (chairman) says that the radio and television division had a much more satisfactory year. The factory worked to capacity and at the end of the year was still in full production. The instrument department made an increased contribution to their turnover and profits and the progress of the marine radar business has been steady. Work for the Ministry of Supply and other Government Departments represents a substantial proportion of their activity. The results of the Sterling Cable Co.Ltd., though satisfactory, were affected by increasing world competition, and Best Products Ltd., continues to prosper. This year, up to the present time, the indication is that the company is doing better than a year ago.

Strand Electric Holdings, Ltd., reports a net consolidated profit of £5,146, after charging taxation, for the year ended 30th April last, as compared with £15,874 for the previous year. The dividend for the year is unchanged at 17½ per cent.

Morgan Crucible Co.Ltd., reports a group trading profit for the year ended December last of £1,430,019 in comparison with £1,279,272 for the preceding year, which with investment income of £33,109, makes £1,263,128. After meeting various charges there is a balance of £1,135,046 (against £1,195,109). Taxation absorbs £591,298, and after deducting retained in subsidiaries, the profit of Morgan Crucible is £366,065 (against £540,680). The ordinary dividend for the year is unchanged at 12½ per cent, and the balance carried forward is £127,975 (against £148,808 brought in).

Bylock Electric, Ltd., has deferred consideration of an ordinary dividend until the accounts for the year to 31st July are known.

Cable and Wireless Ltd., reports a net profit for the fifteen months ended 31st March last of £1,895,508 against £1,711,840 for 1948-49. It is proposed to pay a dividend of 5 per cent for the period, maintaining the payment at the annual rate of 4 per cent.

NEW COMPANIES.

Negatron Ltd.- Registered 28th August. Capital £5,000. Manufacturers and installers of neon and fluorescent lighting equipment, etc. Directors: C.Bradshaw, J.Bradshaw and N.Neatham. Regd.office: 3, Springfield Street, Warrington, Lancs.

Mogford Bros., Ltd.- Registered 24th August. Capital £2,000. Electrical, radio, mechanical and general engineers, etc. S.H.Mogford is the first director. Regd. office: 675, High Road, Seven Kings.

Phidelity Magnetic Products, Ltd. Registered 18th August. Capital £2,000. Manufacturers of and dealers in electrical, mechanical, wireless and television apparatus, etc. Directors: F.A.A.Dobbs, K.G.Gould and E.Mawson. Regd.office: 29-31, Euston Road, N.W.1.

LIQUIDATIONS

George Hicks, Ltd.- Winding up voluntarily. Liquidator, Mr.L.P.Gibbs 781, Salisbury House, London Wall, London, E.C.2. Particulars of claim to the liquidator by 30th September.

BANKRUPTCIES

F.F.Chicken, 42-44, Newgate Street, Morpeth, and Biltons Court, Morpeth, Northumberland, radio dealer and electrical contractor.- Receiving Order made 29th August on debtor's own petition. First meeting 12th September at the Official Receiver's office, Gibb Chambers 54 Westgate Road, Newcastle-upon-Tyne. Public examination 10th October at the Court House, 56, Westgate Road, Newcastle-upon-Tyne, 1.

R.S.Warrell, trading as R.S.Warrell & Son, electrician, 2, Norfolk Road, Littlehampton.- Application for discharge to be heard on 21st September at the Court House, Church Street, Brighton.

STOCKS AND SHARES

For the news from Korea to exercise any noticeable effect on Stock Exchange markets at the present time, it has to be either very satisfactory or very discouraging. Otherwise, markets and prices take comparatively little notice of the happenings in the Far East, apart from the fact, of course, that the war out there lays a definite hand of restraint upon business enterprise in stocks and shares. Money continues to pile up in banking accounts, but the success which has attended most of the recent issues is sufficient witness that it is willing to take a reasonable chance when good security and tempting prices offer.

CABLE SHARES

Aberdare Cables ordinary shares, now split into 5s units, are settling down in the neighbourhood of 14s 6d, following the declaration a fortnight ago of the 10 per cent. interim, and the chairman's expectation of a similar final in due course. The present price of the shares, which is equivalent to 58s. for the previous £1 denomination lies about half-way between the extremes of 67s 9d and 52s recorded during the rather eventful course of the year to date. It gives the shares a yield basis of 6⅝ per cent.

Opinions still differ about the dividend basis on which Telegraph Construction ordinary, quoted now at 38s, should be valued since last year's 25 per cent. capital bonus. It will be remembered that the final for 1949 was reduced, in strict proportion, from 5 to 4 per cent, but this year's interim has been restored to 5 per cent. At the former rate, the yield would be under 4¼ per cent., but a 10 per cent. total would raise the return by a full 1 per cent.

COSSOR REVIVAL

A.C.Cossor's group profit of £240,000, comparing with the previous year's loss of £79,000, agreed nearly with market expectations, so that the announcement produced little response in the price of the company's 5s shares. They stand a little over 9s. This time, the profit evidently has to be regarded as a recovery of ground lost in the two preceding years. The net result is to reduce by about £100,000 the group deficit accumulated over that period. Turnover was roughly doubled; overdrafts were reduced by nearly half a million to £383,000; current business is better than last year's. As regards dividend prospects, there still remain two years' dividend arrears on the £500,000 preference capital. Lord Burghley says the company is anxious to resume payments as soon as possible, but it has not yet reached a position to do so. The last ordinary dividend was 25 per cent three years ago.

MISCELLANEOUS MATTERS

Strand Electric Holdings 5s ordinary are quoted at 11s to yield close on 8 per cent from the 17½ per cent dividend just declared. It is the fourth successive distribution at that rate, and is accompanied this time by a preliminary profits statement showing net profits, after tax, of £25,000, against £16,000 previously. Murphy Radio 5s shares are now 7s 6d and have proved a popular newcomer since their market introduction last month at a little under 7s. The premium on Lancashire Dynamo new shares, issued at £4, has hardened to 15s; the final call of 30s per share is due on 1st October. They are on a yield basis of just under 4¾ per cent. A substantial block of Brush Electric 5½ per cent preference shares is on offer at par; the new 4½ per cent preference shares of Laurence, Scott are also available at 20s 3d.

HACKBRIDGE CABLES

Accounts published by Hackbridge Cable Holdings Company confirm a rise of about £6,000 in net profits to a total of £123,000, after tax, for the year ended last March. Allowing for deduction of the preference dividend, the surplus represents 44 per cent on the £450,000 ordinary capital, which receives for the year a 20 per cent dividend - the same rate as before. At 14s, the 5s ordinary shares yield 7 per cent, a return which appears to be connected with a reference in the report to difficult trading conditions in the industry, and to some reduction in turnover, in the first months of the current year.

ELECTRICITY SUPPLY

American Report on Mexico

Shop Window Lighting

Electricity in Mexico.

An exhaustive survey of the electricity sales and requirements of the Mexican Electric Light and Power Co., and its subsidiaries has been made by a New York firm of consulting engineers (Madigan-Hyland). The results have been published in the form of a report which consists of 246 pages with 47 pages of appendices. It covers a very wide field, for in assessing future requirements various phases of Mexican economy are studied; in particular the present position and possible trends of principal industries are examined.

Electrical development has proceeded steadily, though checked by plant shortage in certain periods. In 1948 total requirements of electricity reached 1,768 million kWh; it is estimated that in 1960 the figures will be 3,421 million kWh; this will mean increasing peak capacity of generating plant from 344,100 to 675, 200 kW.

Compulsory Rural Installations.

A Bill prepared for submission to the Manx Legislative Council seeks to empower the Board of Agriculture and Fisheries to direct unwilling landlords in rural areas, to provide for a supply of electricity and water to their tenants when this can be done at a reasonable cost. The landlords would be able to add up to 4 per cent of the capital cost to the annual rent and would have the right to appeal against decisions of the Board. If no appeal were made and the landlord persisted in his refusal the Board would be able to carry out the work and charge it against the landlord.

Fish in Power Station Intakes.

The use of moving lights over the entrances to power station intakes and diversion channels has been tested in California and has proved very successful in keeping fish from entering. Electrical News & Engineering says that a series of tests over a period of three years shows that a light has a more positive effect in the directing of fish than do the electrical shock wiring devices in use. The "attractor" consists of a series of moving lights (6V car lamps with a total up to 300W) suspended several feet above the water at the entrance to the diversion channel. Revolving searchlights directed towards the water surface are also used.

Barking-Ilford Cable Contract.

The contract for the supply and installation for the British Electricity Authority of 132W cables between Barking and Ilford which has been awarded to the British Insulated Callender's Cables Group will involve some 9,000 route yards of two 0.60 sq.in. 3-core 132 kV impregnated pressure cables and associated auxiliary cables, and a small quantity of 0.60 sq.in. 3-core 33 kV solid-type cable.

Display Lighting Restrictions.

Owing to the shortage of electrical generating plant and the attendant need for the restraint in the use of electricity while the industrial demand is highest, it is not possible to remove altogether the existing restrictions upon shop-window and other advertisement lighting during the coming winter, but the Minister of Fuel and Power has decided that they need only apply on Mondays to Fridays as follows:- (a) From 7 a.m. to 1 p.m. between 9th and 22nd October; (b) From 7 a.m. to 6 p.m. between 23rd October and 31st January. During these periods the use of electricity from the public supply for shop-window and advertisement lighting will be prohibited. There will be no restrictions on Saturdays or Sundays. The position in February and March will be considered early in the New Year.

CONTRACT INFORMATION

Accepted Tenders and Prospective Work

CONTRACTS OPEN

Australia.- Melbourne.- 27th September. State Electricity Commission of Victoria. Steel and timber lifting masts. (See 1st September issue).

Belfast.- 14th September. Northern Ireland Hospitals Authority. Rewiring the main and administrative blocks, including the supply and erection of fittings and equipment, etc. at Musgrave Park Hospital. (Deposit: £5.5s.) Particulars from J.R.W.Murland, engineer, 13, Wellington Place.

Blackburn.- 21st September. Corporation. Electric street lighting installation.

Egypt.- Cairo.- 4th November. City Electricity & Gas Administration. One 20-25,000 kW turbo-alternator and two boiler units. (CRE (IB) 63682/50. Ten/1600).*

30th November. Department of Mines (Fuel Affairs). Diesel pumping plant. (See 1st September issue)

Heywood.- 15th September. Borough Council. Electric paper baler and overband magnetic separator and refuse handling plant for the Destructor Works, Peel Lane. Particulars from W.H.Jewell, manager.

India.- New Delhi.- 17th September Director of Industries and Supplies Twenty-three 125 kVA and ten 62.5 kVA generating sets. (CRE (IB) 63297/50. Ten/1592)*

Kidderminster.- 22nd September. Corporation. Domestic electrical installations in 332 houses on various estates. (See 1st September issue).

New Zealand.- Wellington.- 3rd October. Post and Telegraph Department. Submarine telephone cable. (CRE (IB) 62682/50. Ten/1560.) ♣

Peterborough.- City Council. Electrical installations in eighty-six houses.

Salford.- 18th September. City Engineer's Department. Electrical installations in four shops, four maisonnettes and 259 flats. (See 25th August issue.)

Syria.- Aleppo.- 14th October. Ministry of Public Works and Communications. Pumping and generating units. (CRE(IB) 62294/50. Ten/1554)

Tangier.- 3rd October. International Administration of Tangier. H.v. cables and terminal and junction boxes. (CRE(IB)63502/50. Ten/1599).*

11th October. Telephone Co. of Tangiers. 1,000 telephone instruments. (CRE (IB) 62688/50. Ten/1571.) ♣

Uruguay.- Montevideo.- 6th October. Administracion de les Usinas Electricas y Telefonos del Estado. Two 120 h.p. induction motors. (CRE (IB) 62724/50. Ten/1580.) ♣

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* Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

ORDERS PLACED

Edmonton.- Borough Council. Improvement of lighting in Dyson's Road, Montague Road, Nightingale Road, Hedge Lane, Church Street, Bury Street and Galliard Road (£12,867).- Eastern Electricity Board.

Denbighshire.- County Council Finance and General Purposes Committee. Electrical installations in connection with the extension of the County Offices, Ruthin (£15,237).- Engineering Services Installations, Ltd.

Dewsbury.- Corporation. Electrical installations for shops and flats in Walnut Lane (£340).- "Q" Electrics, Ltd. Electrical installations in 146 houses at Chickenley (£4,758).- Harlow & Milner, Ltd.

CONTRACTS IN PROSPECT

Bathavon.- Houses (44), Batheaston and Whitchurch; H.H.Goldsmith, architect, 18, Gay Street, Bath.

Beaumaris.- Houses (30) for Beaumaris Housing Association;

architect, S.Colwyn Ffoulkes, Colwyn Bay.

Birchington.- Workshops and stores; A.Miles & Son, 18 Lincoln Gardens.

Blackpool.- Houses (28) at Tyrone Avenue, for B.C.; R.Fielding & Son, Stanhope Road Works.

Bolden.-Houses and bungalows (50); surveyor, U.D.C.Offices, East Boldon.

Brighton.- Methodist church, Crabtree Avenue; Denman & Son, architects, 27 Queen's Road.

Bristol.- School, Glenfrome Road, Eastbille (280 places), for E.C.; J.Nelson Merdith, city architect.

Cambridge.- Junior and Infants School, Queen Editn's Way for T.C.; borough surveyor.

Devonport.- Workshops for the Admiralty; Wakeham Bros, Ltd., builders, Knighton Road, Plymouth.

Dover.- Houses (32), Buckland Valley; borough surveyor, Brook House.

Enfield.- Works extensions; Braham Paterson and Benham, Ltd., Clay Hill.

Ennerdale.- Scheme for 250 houses, Distington, for R.D.C.; surveyor, Council Chambers, Cleator.

Exeter.- Block of shops and offices, High Street; Exeter Building Contractors, Ltd., 14 Dix's Field.

Farnborough.- Houses (100), Fox Lane, for U.D.C.; surveyor.

Glasgow.- Animal hospital, Garscube, for University of Glasgow; Gillespie, Kidd & Koia, architects, 19 Waterloo Street.

Houses (624), Merrylee Road, for T.C.; city housing architect.

Grimsby.- Flats (20) and eight shops, Nunsthorpe Estate, for T.C.; borough surveyor.

Guildford.- Maternity and Gynaecological Block at St.Luke's Hospital; architect to South West Metropolitan Regional Hospital Board, 76 Wimpole Street, W.1.

Hadleigh.- Houses (70); Kind & Co. (Leytonstone), Ltd., 564, High Road, E.11.

Harrogate.- Extensions to operating theatre, Royal Bath Hospital, Cornwall Road; architect to Leeds Regional Hospital Board, 29-31 Eastgate, Leeds.

Haverfordwest.- Houses (134), in twelve parishes, for U.D.C.; W.D. Hill, clerk, 10, Picton Place.

Hemsworth.- Houses and bungalows (46), Great Houghton and South Elmsall. for R.D.C.: S.Price, surveyor, Brierley Hall, Brierley, near Barnsley.

Hereford.- Extensions to offices at Bridge Street for David Allen & Carver; architects, Scriven, Powell & James, Cathedral Chambers, King Street.

Nurses' home at County Hospital; D.A.Goldfinch, architect, 10 Augustus Road, Birmingham, 15.

Huddersfield.- Approved county primary school at Almondbury; four additional classrooms and kitchen and dining block at Greenhead High School; houses (54) Dalton Estate; borough architect.

Hull.- Reconstruction of mill (£100,000); J.Rank, Ltd., Great Union Street.

Kings Lynn.- Factory, for the Bestyett Mineral Water Co.; H.Marsh, architect, King Street.

Lichfield.- School of art, for Staffs. C.E.; A.C.H.Stillman, county architect, Green Hall, Lichfield Road, Stafford.

Liverpool.- Colony for 700 beds, Newchurch Hospital; Regional Hospital Board, Alexandra Buildings, 19 James Street.

London.- Offices, Eagle Street, London, W.C.1. (£225,000): Goodliffe Estates, Ltd., 11 Brownlow Street, W.C.1.

Hostel for Indian students, Fitzroy Square, W.1(£80,000), for Indian Government; R.Tubbs, architect, 35 Welbeck Street, W.1.

Catford.- Dwellings (80), Beckenham Hill Road, for L.C.C.; T.H. White, architect, 14a, Cavendish Place, W.1.

Mill Hill.- Church and hall; R. Mountford Pigott, 3 Cromwell Road, S.W.7.

Upper Norwood.- Works extensions, H.E.Daniel, Ltd., St.Bernards Works, Stoney Lane.

Mansfield Woodhouse.- Houses (72) at Cox's Lane Estate for U.D.C.; C.H.Hill & Sons, Victoria Street, Mansfield.

Newcastle-on-Tyne.-Roman Catholic Church, Whickham View; J.J.Glynn, 41, Derby Street.

Newcastle, Staffs.- New warehouse premises; Brassingtons, Ltd., 47, Penkhull Street.

Nottingham.- Secondary school at Wigman Road for E.C.; city engineer, R.M.Finch.

New factory for Raleigh Industries, Ltd., Lenton; Thomas Bow, Ltd., builders. 45. Lamartine Street.

Portishead.- New chemical works; Albright and Wilson, Ltd., Oldbury,